BEFORE

THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA

DIRECT TESTIMONY

OF

AARON L. ROTHSCHILD

ON BEHALF OF

THE SOUTH CAROLINA DEPARTMENT OF CONSUMER AFFAIRS

Docket No. 2019-290-WS

January 23, 2020

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I. STATEMENT OF QUALIFICATIONS

Q. PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS.

A. My name is Aaron L. Rothschild. My title is President and my business address is 15 Lake Road, Ridgefield, CT.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am President of Rothschild Financial Consulting.

Q. PLEASE STATE YOUR EDUCATIONAL ACHIEVEMENTS AND PROFESSIONAL DESIGNATIONS?

A. I have a B.A. (1994) degree from Clark University in mathematics and an M.B.A. (1996) from Vanderbilt University.

Q. PLEASE DESCRIBE YOUR BUSINESS EXPERIENCE.

A. I provided financial analysis in the telecom industry in the United States and Asia Pacific from 1996 to 2001, investment banking consulting in New York, complex systems science research regarding the power sector at an independent research institute and I have prepared rate of return testimonies since 2002. My business experience includes providing expert witness services to the California Public Advocates Office to evaluate the financial health, basic operation, wildfire cost recovery and organizational culture/governance of gas and electric utilities (I.15-08-019), including evaluating Pacific Gas and Electric bankruptcy restructuring plans . See Exhibit ALR-1 for my resume.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION, OR OTHER STATE COMMISSIONS? IF SO, WHICH COMMISSIONS?

A. I have testified in over 50 cost of capital proceedings before the following state commissions: California, Colorado, Connecticut, Delaware, Florida, New Jersey, Maryland, North Dakota, Pennsylvania and Vermont. See Exhibit ALR-1 for the list of dockets for each of my testimonies.

Q. ON WHOSE BEHALF ARE YOU PROVIDING THIS TESTIMONY?

A. South Carolina Department of Consumer Affairs.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to provide my recommendations to the Public Service Commission of South Carolina ("Commission") regarding the appropriate cost of equity, capital structure and overall cost of capital for Blue Granite Water Company ("BGWC").

II. SUMMARY OF CONCLUSIONS

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. I recommend the following for BGWC for its wastewater operations:

- An overall cost of capital of 7.18%
- A cost of equity of 8.72%
- A capital structure containing 51.04% common equity and 48.96% debt
- A debt cost rate of 5.58%

TABLE 1: ALR RECOMMENDATION - BLUE GRANITE WATER COMPANY
Overall Cost of Capital

	Capital Structure Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	48.96%	5.58%	2.73%
Common Equity	51.04%	8.72%	4.45%
	100.0%		7.18%

Exhibit ALR 1B

Q. PLEASE COMPARE YOUR COST OF CAPITAL RECOMMENDATIONS TO BGWC'S REQUESTED COST OF CAPITAL?

A. The primary reasons Mr. D'Ascendis and I recommend a different cost of equity for BGWC is because he includes a group of 14 "non-price regulated" companies in his analysis. I do not include these 14 companies in my cost of equity calculations because my analysis (See Section IV) reveals they are not comparable in total risk to water utilities, as Mr. D'Ascendis claims. In particular, these non-price regulated companies are not comparable to the water utilities we use in our cost of equity calculations[1]. In fact, my analysis shows that the non-price regulated companies are significantly riskier than the 6 water utilities.

Mr. D'Ascendis' cost of equity recommendation would be 9.8%-10.3%[2], if based on the 6 water companies exclusively.

[1] I use 5 of the 6 water companies used by Mr. D'Ascendis.
[2] D'Ascendis Direct Testimony, page 4, Table 2. 9.8% = average of 9.03%, 10.39% and 9.91%. 10.3% = 9.8% + 0.5% "Business Risk Adjustment".

As shown in Table 2 below, Mr. D'Ascendis and I recommend the same cost of debt (5.58%) and the same capital structure (common equity 51.04% and 48.96 debt%). Our cost of equity recommendations are different, however. My 8.72% cost of equity recommendation results in a 7.18% overall rate of return. Mr. D'Ascendis' 10.2%-10.7% cost of equity recommendation results in an overall rate of return of 7.94%-8.19%.

Table 2: RECOMMENDATION COMPARISON - ROTHSCHILD AND D'ASCENDIS

	Cost of Equity	Cost of Debt	Common Equity %	Debt %	Rate of Return
Rothschild	8.72%	5.58%	51.04%	48.96%	7.18%
D'Ascendis	10.2% - 10.7%	5.58%	51.04%	48.96%	7.94%-8.19%

As shown in Table 3 below, if my 8.72% cost of equity is used to set rates for BGWC the rate of return portion of the revenue requirement will be about $6.6 million. On the other hand, if Mr. D'Ascendis' 10.2% to 10.7% cost of equity recommendation is used to set rates the annual revenue requirement will be between about $7.4 million and $7.7 million. If Mr. D'Ascendis' rate of return recommendations are adopted instead of mine consumers will pay between $0.77 million and $1 million more per year.

TABLE 3: ANNUAL REVENUE IMPACT COMPARISON - - ROTHSCHILD AND D'ASENDIS

		Rate of Return Portion of Rev Requirement		Difference D'Ascendis - Rothschild
Rothschild	$	6,663,090.17		
D'Ascendis				
10.2% cost of equity	$	7,440,744.25	$	**777,654.09**
10.7% cost of equity	$	7,703,465.23	$	**1,040,375.06**

Inputs:

Based on following imputs: Rate Base (Proposed)*	$	76,180,847
Federal income tax rate		21.0%
State income tax rate		5.0%

*Application of Blue Granite Water Company for Approval to Adjust Its Rate Schedules and Increase Rates Schedule C, page 1 of 7

Q. PLEASE SUMMARIZE HOW YOU DETERMINED YOUR 8.72% COST OF EQUITY RECOMMENDATION.

A. To arrive at my recommendations, I applied the following three models to a proxy group of 6 publicly traded water companies ("Water Proxy Group"):

- Constant Growth Discounted Cash Flow Model ("DCF")
- Non-Constant Growth DCF Model
- Capital Asset Pricing Model ("CAPM")

My constant growth DCF model is used by major financial institutions. J.P. Morgan Chase uses the sustainable growth form of the DCF method, as I do, in its 2019 Long-Term Capital Market Assumptions publication[3]. *Principles of Corporate Finance*, a leading financial textbook used in business schools around the world, recommends using the very

[3] 23rd Annual Edition, Long-Term Capital Market Assumptions - Time-tested projections to build stronger portfolios, pp. 62-63.

same method I use to calculate the cost of equity for regulated energy utility companies[4]. My CAPM is based on methodologies used by Value Line, the Chicago Board of Options Exchange (CBOE) and published in peer-reviewed academic journals (e.g. The Review of Financial Studies).

I have determined that the cost of equity for the average company in the Water Proxy Group is 8.75%[5]. I recommend a 8.72%[6] cost of equity for BGWC because it has less financial risk than the companies in my Water Group because it has more equity in its capital structure. This 8.75% result is above the average of the high-end results of my three cost of equity models). As shown in Table 4 below, the high-end results of my three cost of equity models range between 6.96% and 9.68%, averaging 8.75%. The low-end results of my three cost of equity models range between 5.72% and 8.34%, averaging 7.46%.

[4] Brealey, Myers, and Allen (2017), Principles of Corporate Finance, 12th Edition, McGraw-Hill Irwin, New York, page 86-87
[5] Exhibit ALR 2.
[6] Ibid.

TABLE 4: Cost of Equity Model Results

	Low	High
DCF - CONSTANT GROWTH	8.34%	8.76%
DCF - NON-CONSTANT GROWTH	5.72%	6.96%
CAPM		
Risk Free Rate - 3-Month T Bill	7.76%	9.59%
Risk Free Rate - 30-yr T Bond	8.02%	9.68%
Range	7.46%	8.75%

Source: Exhibit ALR 2

My 8.75% cost of equity recommendation is above the average of my high-end results (8.47%) primarily because this Commission expressed concern in BGWC's 2017 rate case (Docket No. 2017-292-WS) regarding its size. In Order No. 2018-345(A), this Commission stated "…there is no dispute that [BGWC] is significantly smaller than its proxy group counterparts, and, therefore, it may present a higher risk."[7]

Q. PLEASE PROVIDE A SUMMARY OF HOW MR. D'ASCENDIS' TESTIMONY COMPARES TO YOUR TESTIMONY, MAJOR FINANCIAL INSTITUTIONS AND RECENT DECISIONS IN WATER UTILITY RATE CASES YOU HAVE BEEN INVOLVED IN.

A. My direct testimony explains that Mr. D'Ascendis' 10.20 – 10.70% recommendation is above (1) return expectations indicated by market data (e.g. stocks, bonds, options), (2)

[7] Page 14.

return expectations published by major financial institutions, and (3) allowed returns in water utility rate cases in which I have filed testimonies.

The following two components of our analyses led to our different cost of equity recommendations:

1. Mr. D'Ascendis cost of equity recommendation (10.20% – 10.70%) is based, in part, on the results of applying his cost of equity models to non-utility companies (14 Non-Price Regulated Companies). Both of us applied our cost of equity models to the same 6 water utilities. My 8.72% recommendation is based only on these 6 water utility companies, however.
2. Mr. D'Ascendis concludes that investors expect stock returns over bonds (risk premium) will be 10.03%. I calculated a risk premium of 9%.

Mr. D'Ascendis claims that his Non-Price Regulated Proxy Group is comparable to the 6 water utility companies (Utility Proxy Group). They are not. Therefore, his cost of equity results based on applying his cost of equity models to this group of non-utilities should be removed from consideration. In BGWC's last rate case (Docket No. 2017-292-WS) this Commission found that "Mr. D'Ascendis' non-price regulated proxy group more accurately reflects the total risk faced by price regulated utilities and [BGWC]."[8] I was not involved in those proceedings and I do not have an opinion on this Commission's decision at that time. In this proceeding Mr. D'Ascendis' Non-Price Regulated Proxy Group consists of a different group[9] of companies. Additionally, market conditions likely have changed, at least to some degree, since 2017. As

[8] Docket No. 2017-292-WS – Order No. 2018-235(A), May 30, 2018, page 14.
[9] Some of the companies are the same in both proxy groups.

discussed below (Section VI.), current stock and option price data indicate that the companies in Mr. D'Ascendis' Non-Price Regulated Proxy Group are significantly riskier.

As shown in Table 5 below, Mr. D'Ascendis' 10.20% to 10.70% cost of equity recommendation is considerably higher than return expectations (5.25-8.75%)[10] published by major banks and brokerage houses.

TABLE 5: COST OF EQUITY COMPARISON

	Nominal	
BGWC Witness Recommendation (December 2019)	**10.20 - 10.70%**	[1]
Charles Schwab - Long-term Market Returns (March 2018)		
U.S. Large Capitalization Stocks	6.50%	[2]
U.S. Small Capitalization Stocks	7.20%	[2]
J.P. Morgan Asset Management - Equity Long-Term Returns (2019)		
U.S Large Cap	5.25%	[3]
Selected Emerging Market	8.00 - 8.75%	[3]

Sources:
[1] Mr. D'Ascendis' Direct Testimony, page 4
[2] Charles Schwab - Why Market Returns May Be Lower in the Future, March 6, 2018.
[3] J.P. Morgan Asset Management - Long-Term Capital Market Assumptions, 2019 Annual Edition, page 65.

The return expectations published by Charles Schwab and J.P. Morgan are based on their own financial models. I provide the data shown in Table 5 to show that major financial institutions are telling their clients to expect lower returns on their investments than the cost of equity proposed by Mr. D'Ascendis. Charles Schwab and J.P. Morgan's published return expectations are for the overall stock market. Mr. D'Ascendis' cost of equity recommendation is for a regulated utility company. It is unlikely that investors would expect to earn a higher return on equity for a cost of service regulated utility company than the overall stock market.

[10] Includes expected returns from selected emerging markets (8.00-8.75%).

Mr. D'Ascendis' 10.20% to 10.70% is not consistent with allowed returns in recent proceedings I have testified in. In 2018 I testified on behalf of the Office of Consumer Advocate (ORA)[11] in California's Water Cost of Capital Proceeding. On March 22, 2018 the California Public Utilities Commission authorized a return on equity (ROE) of between 8.90% and 9.20% for the following California Class A water utilities (Decision 18-03-035):

- 9:20% - California Water Service Company (A17-04-001, 17-04-001);
- 9.20% - California American Water Company (A17-04-001, 17-04-002);
- 8.90% - Golden State Water Company (A17-04-001, 17-04-003);
- 8.90% - San Jose Water Company (A17-04-001, 17-04-006).[12]

III. CAPITAL STRUCTURE, COST OF DEBT AND OVERALL RATE OF RETURN

Q. WHAT CAPITAL STRUCTURE DO YOU RECOMMEND AND WHY?

A. I recommend using BGWC's requested capital structure consisting of 51.04% equity and 48.96% debt because it is consistent with capital structure ratios used by other regulated water companies.

[11] Renamed the "Public Advocates Office" in 2019.
[12] CPUC Press release, CPUC SETS COST OF CAPITAL FOR LARGE WATER COMPANIES, March 22, 2018.

IV. COST OF EQUITY IN TODAY'S FINANCIAL MARKET

Q. HOW DOES YOUR COST OF EQUITY RECOMMENDATION RELATE TO THE CURRENT FINANCIAL MARKET?

A. The United States' economy has been experiencing high stock prices, low unemployment, reasonable global growth, low bond yields, and low inflation expectations. According to a recent J.P. Morgan Asset Management report, "[t]his S&P bull market is the longest on record, with trough-to-peak gains almost twice the bull market average of the last 50 years…"[13] These favorable economic conditions have led to high market-to-book ratios for utility stocks which indicates the cost of equity for utility companies is decreasing. Rates should be set in this proceeding based on the current low cost of capital environment and re-evaluated should conditions change in the future. Since the beginning of 2018, national trade policy has added some risks to companies with exposure to international markets. However, regulated water companies have limited exposure to the adverse effects of a possible trade war. In fact, regulated water companies present an opportunity for investors looking for a way to shed trade policy risk.

The current capital markets indicate that an 8.72% return on equity for investing in a regulated utility company is sufficient to raise capital. Interest rates remain low by historical standards (see Chart 5 on page 20) and yield spreads are low (see Chart 6 on page 21). Lower than average yield spreads indicate a cost of equity lower than the historical average. It is important to consider the results of my cost of equity models (e.g. DCF and

[13] J.P. Morgan Asset Management – Long-Term Capital Market Assumptions, 2019 Annual Edition, page 6-.

CAPM) in the context of current financial market conditions as follows:

1. **Stocks are expensive.** As the S&P 500, Dow Jones Industrial Average and other stock indices increase, investors are paying more for the same earnings, including for utility stocks, than the average of the past 10 years,[14] indicating that the cost of equity is lower than the historical average.
2. **Interest rates are low.** Interest rates are near historical lows (see Chart 3) and the Federal Reserve cut interest rates on July 31, 2019. The market expected this rate cut. In fact, investors expect there is a chance of another rate cut in 2020. Futures market data indicates that market prices reflect investor expectations regarding Federal Reserve policy and, therefore, there is no need to use Blue Chip interest rate forecasts as a proxy for the risk-free rate in a CAPM as BGWC witness has done.
3. **Credit spreads are low.** The spread between the yield investors demand to purchase U.S. Corporate Bonds and U.S. Treasury bonds (see Chart 6) remains at near all-time lows since the last financial crisis of 2008/2009. Low credit spreads support a cost of equity as low, or lower, than at any other time since the financial crisis.
4. **Volatility expectations**. As of December 31, 2019, the Market Volatility Index("VIX") is at relatively low levels. The VIX is a market indicator that allows us to see what investors expect volatility to be in the future.

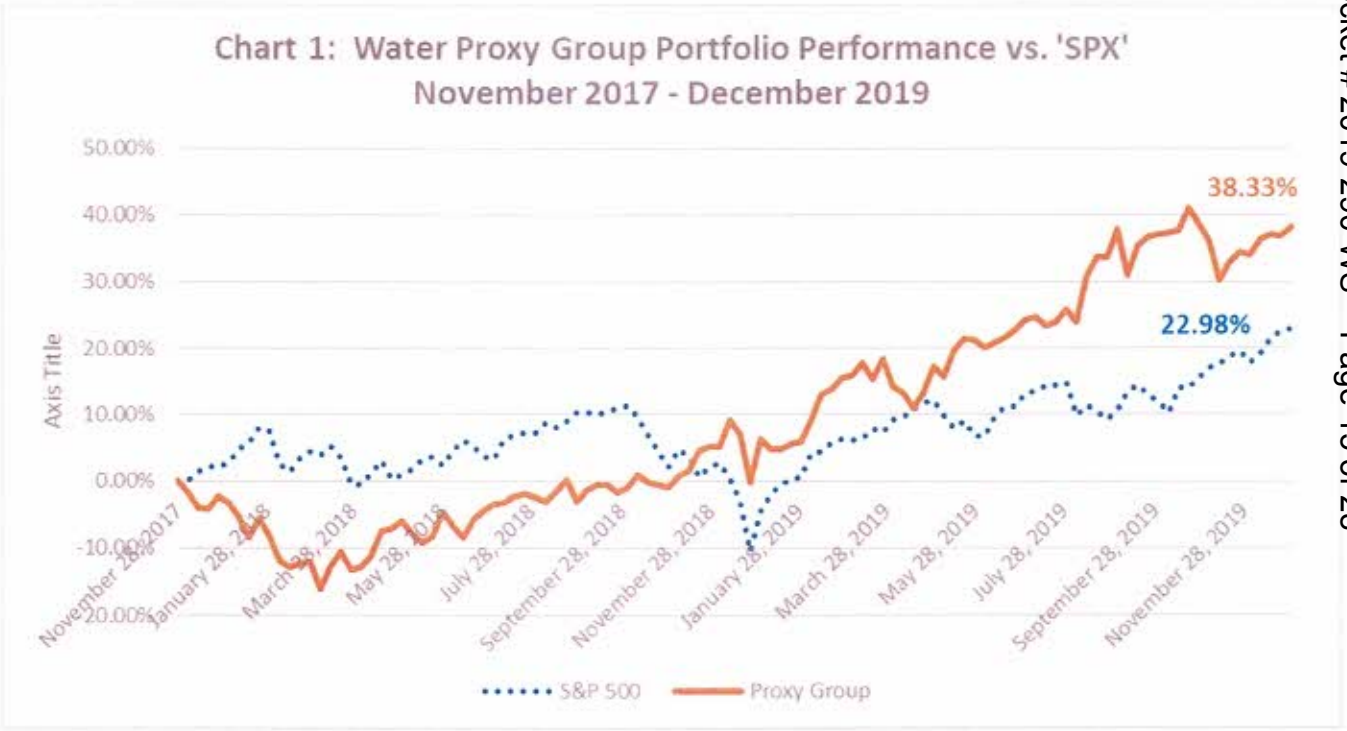
[14] As of December 31, 2019 the S&P 500 has a Price-to-earnings ratio (over 24) nearly twice the average (15.70) since 1880.

As explained below, these factors indicate the cost of equity remains at historically low levels.

A. Stocks Price Trends

Q. WHAT, IF ANYTHING, DOES THE STOCK MARKET DATA INDICATE WITH REGARD TO THE COST OF EQUITY?

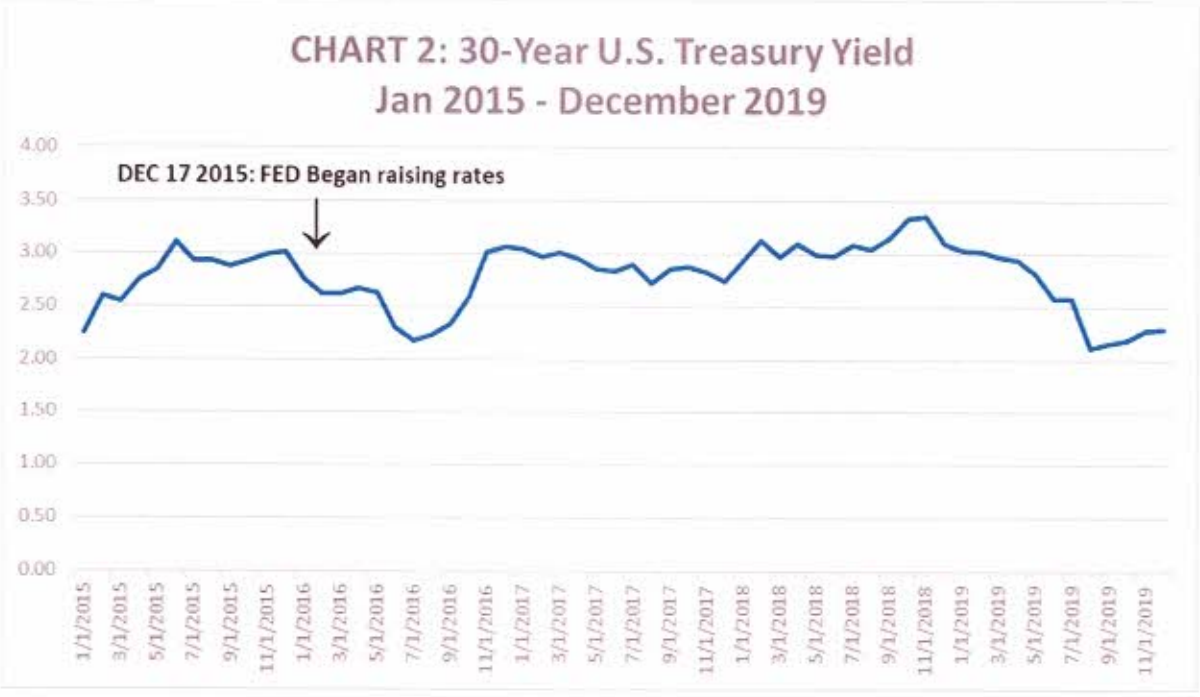
A. As stock prices have increased significantly in recent years, the price-to-earnings ratios have increased as well. This indicates that the cost of equity may be decreasing along with the higher stock prices. As shown in Chart 1 below, stock prices for the S&P 500 and the Water Proxy Group have increased significantly in the past four plus years since BGWC filed their last rate case in 2017. The Water Proxy Group has increased by 38.33% while the S&P 500 has increased by 22.98%.



B. Interest Rates

Q. DO INVESTORS EXPECT LONG TERM U.S. GOVERNMENT BOND YIELDS TO STAY AT THESE LOW LEVELS?

A. Yes. Despite raising the federal funds rate nine times since 2015, yields on long-term U.S. government bonds (2.39% as of December 31, 2019) have not increased since the Federal Reserve began raising rates in December 2015. See Chart 2 below.



As shown in Chart 3 below, yields on 30-year U.S. Treasuries remain low by historical measures:

Q. CAN YOU PLEASE PUT THE CURRENT INTEREST RATE ON 30-YEAR U.S. TREASURY BONDS INTO HISTORICAL PERSPECTIVE?

A. Chart 3 above shows that the yield on 30-year U.S. Treasury bonds has been in a long-term downward trend since the very early 1980's when the annual yield peaked just below 14%. As of December 31, 2019, the yield on 30-year Treasury bonds remains at the historically low yield of 2.39% that has persisted since the middle of 2015.

Q. PLEASE COMMENT ON HOW RECENT ACTION TAKEN BY THE FEDERAL RESERVE TO RAISE THE FEDERAL FUNDS RATE RELATES TO THE BOND YIELDS SHOWN IN CHARTS 4 AND 5?

A. The yields on 30-year U.S. Treasury bonds are market-based and therefore reflect investors' expectations. Since bond prices and yields are inversely related, an investor who expected long-term interest rates to increase soon would not purchase 30-year U.S.

Treasuries because they would lose money. In a liquid market like those for 30-year U.S. Treasury bonds, the yield reflects interest rate expectations of the marketplace. The current yield on 30-year U.S. Treasury bonds is based upon a market with investors who are aware of the comments by the Federal Reserve. In March 2019, the Board of Governors of the Federal Reserve voted to maintain the target federal funds rate at 2.25 - 2.50%. The Committee stated the following:

> In light of global economic and financial developments and muted inflation pressures, the Committee will be patient…[15]

Recent Fed-funds futures indicated that investors believed the Federal Reserve may cut rates in 2020.

It is important to recognize that current long-term interest rates represent a direct observation of investor expectations and there is no need to use "expert" forecasts such as Blue Chip to determine the appropriate risk-free rate to use in a CAPM analysis or any other cost of equity calculations.

Q. DO YOU KNOW WHAT INTEREST RATES WILL BE IN THE FUTURE?

A. No. As noted above, Jerome Powell, the Federal Reserve Board Chair, has said "we will be patient," regarding changing the federal fund rate, but, he explained, that the Federal Reserve is "always prepared to shift the stance of policy."[16] He emphasized the uncertainty surrounding forecasting the economy and the financial markets in a 2018 speech, stating:

> You could imagine narratives in which that [forecast] would make sense, but honestly, I wouldn't put too much on that.[17]

[15] Federal Reserve Press Release, May 1, 2019.
[16] "Powell says Fed 'will be patient' with monetary policy as it watches how economy performs", CNBC, January 4, 2019.
[17] "Fed Raises Rates and Signals Faster Pace in Coming Years" The Wall Street Journal March 21, 2018.

Many economists and forecasters will continue to be quoted in the press prognosticating on possible developments that are truly unpredictable. The Nobel Laureate Economist Daniel Kahneman stated the following regarding forecasting:

> It is wise to take admissions of uncertainty seriously, but declarations of high confidence mainly tell you that an individual has constructed a coherent story in his mind, not necessarily that the story is true.[18]

Kahneman also found that the trading industry is based on an "illusion of skill."[19]

BGWC's actual cost of capital is based on the current capital markets. More fundamental to economic regulation, a market-based cost of equity is consistent with ratemaking principles.[20]

Q. ARE YOU AWARE OF STUDIES THAT HAVE SHOWN THE CHALLENGES OF FORECASTING FINANCIAL MARKETS?

A. Yes. A Duke University study demonstrated that U.S. financial executives were over-confident in their ability to predict financial markets. The Chief Financial Officers (CFOs) in the study estimated the returns of Standard and Poor's Index over the following year. The 80% confidence interval provided by the CFOs contained only 33% of the realized returns.[21] The correlation between their estimates and the true value of returns was slightly less than zero.

An additional study conducted by McKinsey and Company to determine the accuracy of analysts' earnings forecasts found that the analysts were overly optimistic,

[18] Daniel Kahneman, *Thinking Fast and Slow* (New York: Farrar, Straus and Giroux, 2011): 212.
[19] Id.
[20] The U.S. Supreme Court in the *Hope* and *Bluefield* cases, established that the cost of equity should support a utility's credit, enable raising money, assure financial soundness and "be commensurate with returns on investments in other enterprises having corresponding risks."
[21] Itzhak Ben-David, John R. Graham, Campbell R. Harvey, *Managerial Miscalibration*, July 2010, page 30.

slow to revise their forecasts, and prone to making increasingly inaccurate forecasts during economic downturns. Moreover, as indicated by P/E (price/earnings) ratios, the investors' expectations were more conservative.[22]

Q. HAVE THE BLUE CHIP INTEREST-RATE FORECASTS BEEN ACCURATE?

A. No. As Chart 4 below shows, Blue Chip Financial forecasted in 2012 that 10-Year U.S. Treasury bonds would be over 5% by 2018, when they are actually under 3%.

CHART 4: Dec 2010 Blue Chip Financial Forecasts Vs. Actual 10 Year U.S. Treasury Yields

The time covered in Chart 4 was chosen to provide a concrete example. Blue Chip's interest rate forecasts have been persistently inaccurate for decades. A recent paper published by the Congressional Budget Office determined Blue Chip consensus forecasts

[22] Marc H. Goedhart, Rishi Raj and Abhishek Saxena, *Equity Analysts: Still too bullish*, Spring 2010, page 14.

exhibited "significant positive bias" between 1984 and 2012 and "have become more biased and less accurate over time."[23]

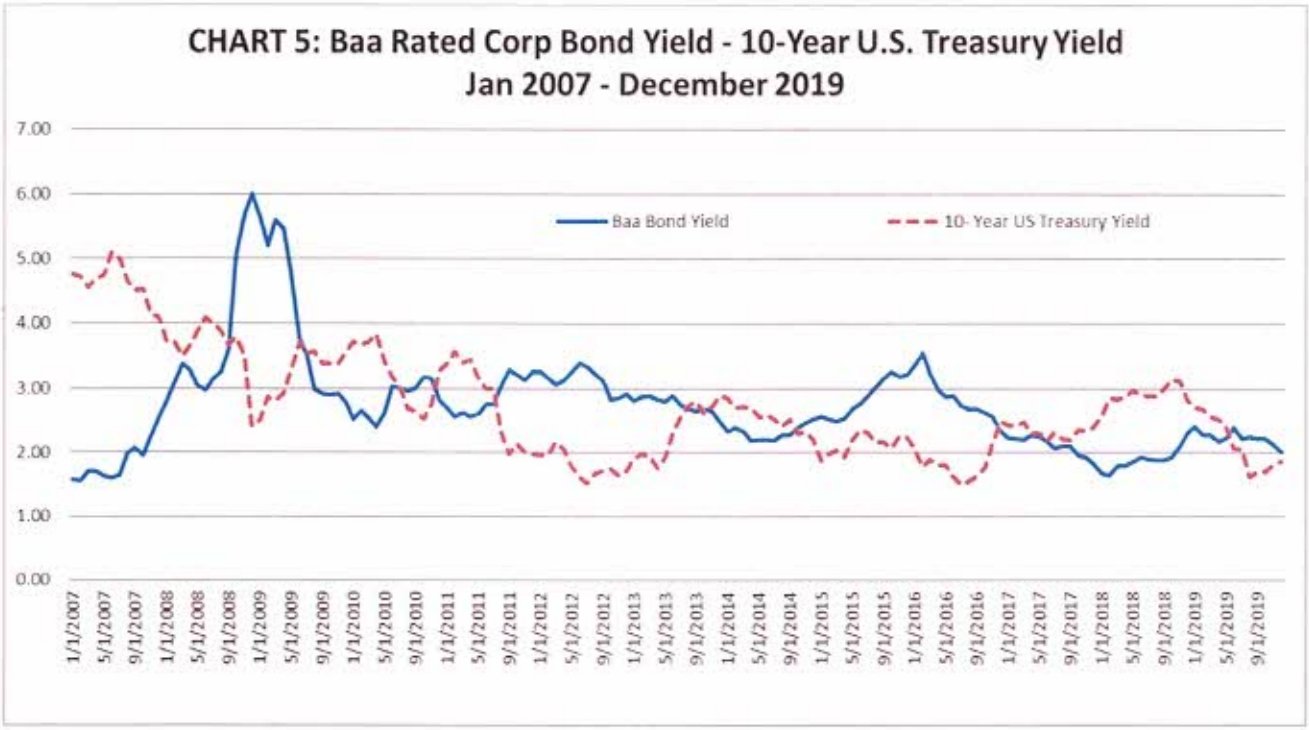
C. Low Credit Spreads

Q. WHAT DO LOW U.S. TREASURY YIELDS MEAN FOR THE COST OF EQUITY?

A. Historical market data indicates that a low interest rate environment, like we have now, indicates a low cost of equity. Chart 5 below shows that as interest rates decrease, the yield credit spread between Baa rated corporate bonds and U.S Treasury bonds, which is a proxy for the cost of equity, has remained relativity stable (except for the great recession). This chart indicates that the cost of equity decreases as interest rates decrease because the extra yield investors demand to purchase Baa, Corporate bonds, and equities, is over a lower "risk free"[24] rate of return.

[23] Did Treasury Debt Markets Anticipate the Persistent Decline in Long-Term Interest Rates?, Congressional Budget Office, Edward N. Gamber, page 2. This paper can be found at: https://www.cbo.gov/system/files/115th-congress-2017-2018/workingpaper/53153-interestrateswp.pdf

[24] The return on investments with no chance of loss. For example, short-term U.S. Government bonds virtually risk-free rate because the U.S. Government can print money to avoid default.



D. Volatility Expectations

Q. WHAT IS YOUR BASIS FOR CLAIMING THAT INVESTORS VIEW THE MARKETS AS LESS RISKY?

A. The Market Volatility Index ("VIX") is a market indicator that allows us to see what investors expect volatility to be in the future. Volatility, uncertainty, and risk are synonymous. Therefore, the VIX index can be a valuable tool to determine investors' assessment of the riskiness of financial markets. This is a more direct route than trying to monitor world events, analysts' forecasts and surveys. This direct route has not only proven to be more accurate than forecasts and interpretations, but is also aligned with the principle that the cost of capital is a market-based concept.

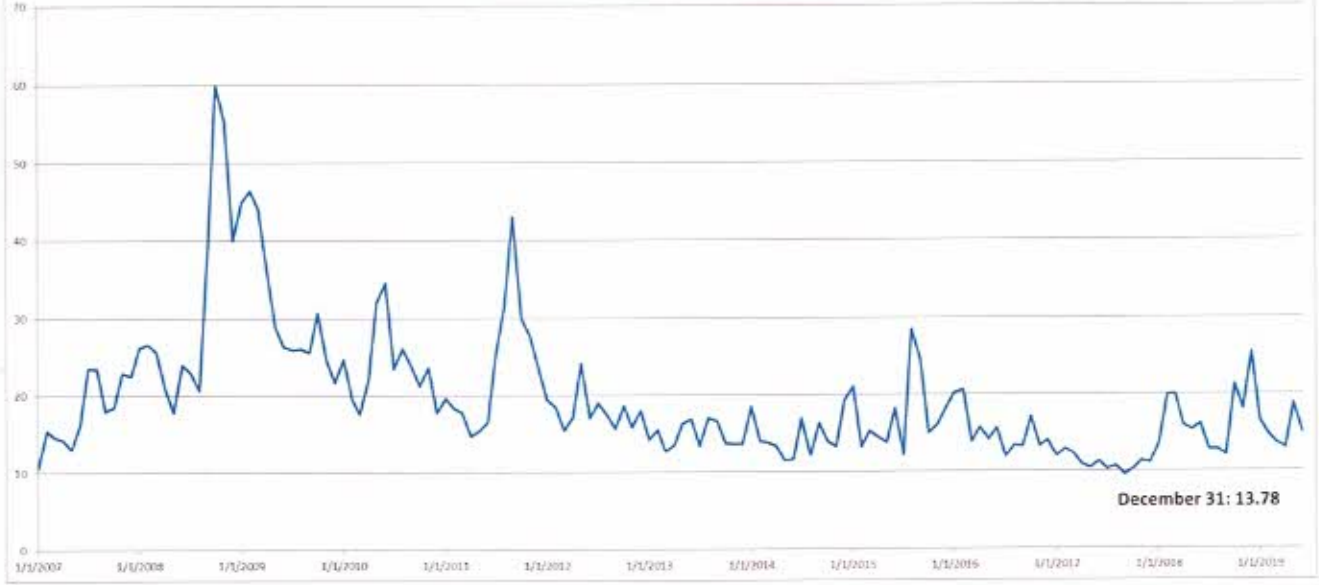
Q. PLEASE EXPLAIN FURTHER WHAT THE VIX INDEX IS AND HOW IT IS ESTABLISHED.

A. The Chicago Board Options Exchange ("CBOE") VIX is based on options on the S&P 500 Index and reflects the market consensus expected volatility in the S&P 500 over the next 30 days on an annual basis. It is sometimes known as the "fear index."

Q. WHAT IS THE MARKET PRICE OF THE VIX CURRENTLY AND HOW DOES THIS COMPARE TO PRICES DURING THE GREAT RECESSION?

A. As of December 31, 2019, the VIX Index was trading at 13.78, indicating that investors expect an annualized change of 13.78% over the next 30 days. At the height of the financial crisis in 2008, the VIX Index was trading at over 80, indicating that investors expected an annualized change of over 80% over the same 30-day period. As can readily be seen in the chart below, the VIX Index is significantly lower than it was during the financial crisis and is nearing pre-crisis levels.

CHART 6: VIX Index Jan 2007 - December 2019



V. COST OF EQUITY CALCULATION

A. Overview

Q. PLEASE PROVIDE YOUR DEFINITION OF THE COST OF CAPITAL.

A. The cost of capital is the return investors require to provide capital to BGWC based on current capital markets. My cost of equity ("COE") recommendation is my opinion of the return investors require to provide equity capital to BGWC based on current capital markets. My recommendation is consistent with the following legal standards set by the United States Supreme Court set for a fair rate of return:

> The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks.[25]

And

> …sufficient to…support its credit and…rase the money necessary for the proper discharge of its public duties.[26]

Because the cost of equity is not a published figure like a bond yield, some interpretation is required to determine the appropriate market price. My cost of equity recommendation is based on my computation of what the market indicates investors require (return on investment) to provide capital to companies with comparable risk to BGWC.

As explained below, I use current market prices (e.g. stocks, bonds, options), which measures investors' expectations directly, instead of relying solely on historical data and analyst forecasts.

[25] Federal Power Commission v. Hope Natural Gas Company (1944) 320 U.S. 591, 603.
[26] Bluefield Water Works & Improvement Company v. Public Service. Commission of the State of Virginia (1923) 262 U.S. 679, 692-693.

A cost of equity based on market prices (market-based) is superior to a cost of equity based on historical data (non-market-based) for two reasons:

- The cost of equity that BGWC has to pay investors is based on capital markets. Interest rates remain at historical low levels after a persistent downtrend since the early 1980s (see Chart 3 above). It is possible interest rates will increase, but if the marketplace expected interest rates to change, then that would already be part of current prices.
- Capital markets are unpredictable. Regarding capital markets' unpredictability, investment guru Warren Buffet recently gave the following advice to investors:

> "They should not listen to a lot of the jabbering about what the market is going to do tomorrow, or next week or next month because nobody knows."[27]

Research, which I will present later in my testimony, supports Mr. Buffet's advice to investors and my opinion that the cost of equity should be based on current capital markets. Current capital markets are our best source of investors' expectations regarding future capital markets.

Current market prices of stocks and bonds reflect investors' forecasts for long-term interest rates and capital markets in general. If, indeed, investors in aggregate should be expecting an increase in interest rates, adding a separate factor for this on top of what is already indicated in market prices would amount to a double-count.

[27] PBS News Hour, June 26, 2017, Part 1 – America should stand for more than just wealth, says Warren Buffett.

Q. WHICH COMPANIES DID YOU INCLUDE IN YOUR COMPARABLE GROUP OF UTILITY COMPANIES TO DETERMINE YOUR COST OF EQUITY RECOMMENDATION?

A. I included the following 6 utility companies, referred to as the Water Proxy Group: (1) American States Water, (2) American Water Works, (3) Aqua America, (4) California Water Service Group, (5) Middlesex Water Company, and (6) York Water. Mr. D'Ascendis Utility Proxy Group includes 5 of the 6 water companies in my Water Proxy Group.

Q. HOW DID YOU ARRIVE AT YOUR COST OF EQUITY RECOMMENDATIONS?

A. I used both a constant growth and non-constant growth Discounted Cash Flow ("DCF") method. My constant growth DCF method determines growth based on the sustainable retention procedure. My non-constant growth method is based on estimated dividend growth for the next 5-years and capital gains. Additionally, I used a Capital Asset Pricing Model ("CAPM") based on current market data. Later in my testimony, I explain the theory behind both the DCF and CAPM methods.

B. Discounted Cash Flow

Q. HOW DID YOU ARRIVE AT YOUR DCF-BASED COST OF EQUITY RECOMMENDATION?

A. I used the constant growth form of the Discounted Cash Flow ("DCF") method that determines growth based on the sustainable retention growth procedure and a non-constant DCF method. My constant growth form DCF analysis indicates a cost of equity range of

between 8.34% and 8.76% for the Water Proxy Group.[28] The results of my non-constant DCF method indicates a cost of equity of between 5.72% and 6.96% for the Water Proxy Group.[29] Based on these results from my constant growth and non-constant growth DCF methods, I concluded that an 8.75% cost of equity for the Water Proxy Group is conservatively high. I recommend an 8.72% cost of equity for BGWC because, based on its requested capital structure, it has slightly less financial risk than my Water Proxy Group.

Q. WHAT IS THE DISCOUNTED CASH FLOW METHOD?

A. The DCF method, is an approach to determining the cost of equity. The method recognizes that investors purchase common stock to receive future cash payments. These payments come from: (a) current and future dividends, and (b) proceeds from selling stock. A rational investor will buy stock to receive dividends and to ultimately sell the stock to another investor at a gain. The price the new owner is willing to pay for stock is related to that buyer's expectation of future flow of dividends and the future expected selling price. The value of the stock is the discounted value of all future dividends until the stock is sold plus the value of proceeds from the sale of the stock.

Q. HAVE INVESTORS ALWAYS USED THE DCF METHOD?

A. While investors who buy stock have always done so for future cash flow, the DCF approach first appeared in the 1937 Harvard Ph.D. thesis of John Burr Williams titled *The Theory of Investment Value*. Author Peter L. Bernstein once stated, Williams' model for valuing a security calls for the investor to make a long-run projection of a company's future dividend

[28] See Exhibit ALR 2.
[29] See Exhibit ALR 4.

payments…"[30] The Williams DCF model separately discounts each and every future expected cash flow. Dividends and proceeds from the sale of stock are the expected cash flows. Its accuracy is therefore unaffected by non-constant growth rates. Myron Gordon and Eli Shapiro who helped to make this method widely used, referred to Williams' work in their paper published in 1956 "Equipment Analysis: The Required Rate of Profit."

C. Constant Growth Form of the DCF Model

Q. YOU STATE YOU USED THE CONSTANT GROWTH FORM OF THE DCF MODEL. WHAT IS THE CONSTANT GROWTH FORM OF THE DCF MODEL?

A. The constant growth form of the DCF model is a form of the DCF method that can be used in determining the cost of equity when investors can reasonably expect that the growth of retained earnings and dividends will be constant.

Retained earnings are funds that a company keeps in its treasury, so that it is available for future needs, such as operating expenses, capital expenditures, debt payments, and new investments. These retained earnings show investors whether the company is growing which, in turn, is a measure of the future indicator of dividends and the value of a company's stock.

Q. DESCRIBE HOW THE CONSTANT GROWTH MODEL WORKS.

A. The constant growth model is described by this equation k= D/P + g, where:[31]

k= cost of equity;
D=Dividend; and
P=Market price of stock at time of the analysis.

and where:

g=the growth rate, where g= br + sv;

[30] P. BERNSTEIN, *Capital Ideas: The Improbable Origins of Modern Wall Street* (The Free Press, © 1992).

[31] M. GORDON, *Cost of Capital to a Public Utility*, at 32-33 (MSU Public Utility Studies 1974).